

## Sound Wall Design

### A. General Requirements

Building specifications, rather than bridge specifications, are more applicable for designing sound walls mounted on the ground. Many of the requirements in this criteria are taken from the 1979 edition of the *Uniform Building Code* (UBC).

### B. Wind Loads

The wind loads given in Memo to Designers 22-1 satisfy UBC wind requirements for structures located less than 30 feet above the average level of the adjoining ground. Sound walls are generally no higher than 14 feet, and usually placed less than 30 feet above the average level of the adjoining ground.

Sound walls on bridges and retaining walls are subject to a higher risk of endangering lives if failure were to occur, thus the 20 psf and 30 psf wind loads specified in Memo to Designers 22-1 are recommended for designing these walls. The 30 psf is approximately equal to a wind pressure created by an 80 mph wind.

### C. Seismic Loads

The seismic load of 0.3 dead load also meets UBC seismic requirements for masonry or concrete fences over six feet in height. Because the seismic response characteristics of sound wall may be adversely affected by the bridge supporting it, a seismic load of 1.0 dead load is specified for designing sound walls on bridges. For the same reason a seismic load of 3.2 dead load on bridges and 2.0 dead load on retaining walls is to be used for designing connections of prefabricated sound walls. In addition to their primary function as noise attenuators, sound wall barriers are frequently used as earth retaining structures on embankments. During an earthquake, seismic loads are generated both by the mass of the wall and by the mass of the fill being retained. Since the probability is slight that the seismic load of these two masses would ever be acting in phase, the loads should be combined and then assigned a lower load factor.

### D. Piling

The following information on Sheet Piling Design can be applied to many design problems (i.e. sound walls, retaining walls, etc.).

There are computer programs in existence with formats that follow this criteria. Be sure to understand the program before using it. A listing of programs may be obtained from the Sound Wall Specialist.

# 1. Lateral Soil Pressure by the Sheet Piling Procedure

This method is taken from the U.S.S. Steel Sheet Piling Design Manual and may be used for determining the allowable ultimate lateral soil pressures that are required in the design of short rigid pile or continuous trench footing supports located in level or sloping ground. Note that the effect of the berm on the soil pressures for the sloping ground cannot be included with the sheet piling analysis.

Where:  $\phi$  = angle of shearing resistance;

$\gamma$  = unit weight of soil;

$\beta$  = slope angle;

$\delta$  = wall friction angle;

$P_p$  = passive soil pressure;

$P_a$  = active soil pressure;

$R$  = reduction factor for  $K_p$ ;

$Q$  = allowable net horizontal ultimate lateral soil pressure.

## a) Procedure:

(1) Obtain  $\phi$  and  $\gamma$  values from the Foundation Report.

(2) For cohesionless fills the  $\phi$  angle must be greater than the slope angle,  $\beta$ . Generally, the fills are designed for a factor of safety (FS) of 1.25, where  $FS = \tan \phi / \tan \beta$ .

For determining the passive and active pressures on cohesive fills the  $\tan \phi$  may be assumed to be equal to  $1.25 \tan \beta$  and  $C = 0$ , where  $C$  is the unit cohesive strength of the soil. Note that a more rigorous analysis may be used to include  $C$  with the actual  $\phi$  angle for determining the passive and active pressures. There is, however, no known information available on this type of analysis when slopes and berms are involved.

(3) For concrete piles  $\delta$  may be assumed to equal  $\frac{2}{3} \phi$ .

(4) Determine the active and passive pressures of the slope and/or of the level ground using the chart on Figure 1. Note that if the wall friction angle is used, the  $P_p$  force is not acting horizontally and must be considered in the stability analysis. Note also that the net soil pressures acting on the embedded pile are equal to the passive pressure on one side less the active pressure from the *opposing* side.

## b) Example: Soil Pressure by the Sheet Piling Procedure

This example illustrates the procedure for determining the allowable ultimate lateral soil pressures for sloping ground on one side of a pile and level ground on the opposite side.

Given:  $\phi = 35^\circ$ ;  $\gamma = 120$  PCF;  $\beta = -26.57^\circ$  (2:1 slope)

Calculate,

$$\beta/\phi \text{ (slope side)} = -26.57/35 = -0.759$$

$$\beta/\phi \text{ (level side)} = 0.0$$

$$\delta = -\frac{2}{3}\phi = -\frac{2}{3}(35) = -23.33^\circ; \cos \delta = 0.918$$

$$\delta/\phi = -23.33/35 = -0.667$$

Check slope stability,

$$FS = \tan \phi / \tan \beta = 1.4 > 1.25 \text{ — OK}$$

From chart on Figure 1,

$$R = 0.808$$

$$K_p \text{ (slope)} = 2.3; K_a \text{ (slope)} = 0.22$$

$$K_p \text{ (level)} = 10.1; K_a \text{ (level)} = 0.27$$

Find Passive Pressure

$$P_p = R \times K_p \times \gamma$$

$$P_p \text{ (slope)} = 0.808 \times 2.3 \times 120 = 223 \text{ psf/ft}$$

$$P_p \text{ (level)} = 0.808 \times 10.1 \times 120 = 979 \text{ psf/ft}$$

Find Active Pressure

$$P_a = K_a \times \gamma$$

$$P_a \text{ (slope)} = 0.22 \times 120 = 26 \text{ psf/ft}$$

$$P_a \text{ (level)} = 0.27 \times 120 = 32 \text{ psf/ft}$$

Apply Horizontal Correction

$$P_p^{\text{horiz}} \text{ (slope)} = 223 \times 0.918 = 205 \text{ psf/ft}$$

$$P_p^{\text{horiz}} \text{ (level)} = 979 \times 0.918 = 899 \text{ psf/ft}$$

$$P_a^{\text{horiz}} \text{ (slope)} = 26 \times 0.918 = 24 \text{ psf/ft}$$

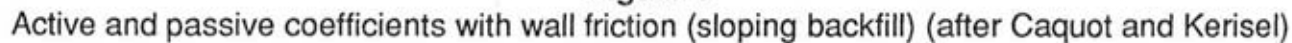
$$P_a^{\text{horiz}} \text{ (level)} = 32 \times 0.918 = 29 \text{ psf/ft}$$

Determine Allowable Net Horizontal Ultimate Lateral Soil Pressure

$$Q = P_p - P_a$$

$$Q \text{ (slope)} = 205 - 29 = 176 \text{ psf/ft}$$

$$Q \text{ (level)} = 899 - 24 = 875 \text{ psf/ft}$$



## 2. Trench Footing or Pile Embedment by Sheet Pile Analysis

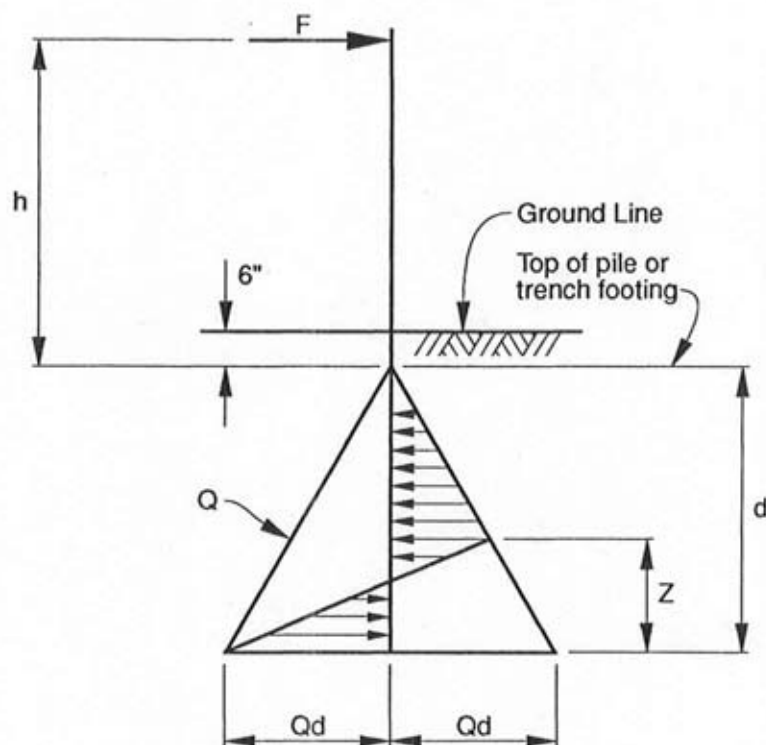
The following procedure *may be* used in determining the embedment depths of trench footings or pile supports that are located in level ground. The level ground condition was defined previously and is shown on Figure 4 of Memo to Designers 22-1. This procedure is based on the U.S.S. Steel Sheet Pile Design analysis. The trench footing embedment example assumes a 1'-0" section taken along the length of the trench. In determining pile embedments include the pile diameter and the appropriate 'ISOLATION' factor in the calculations. 'Isolation' factor is the increase factor used to account for effective passive pressure; 1.5 for cohesionless soils and 1.0 for cohesive soils. See Memo to Designers 22-1.

Where:  $F$  = applied ultimate lateral load in pounds;

$h$  = distance in feet from supporting material to point of application of  $P$ . Disregard upper 6 inches of supporting material;

$Q$  = allowable net horizontal ultimate lateral soil pressure in psf/ft;

$d$  = required depth of embedment in feet.



$$\sum F_H = 0 = (2Qd \times \frac{1}{2} \times Z) - (\frac{1}{2} \times Qd^2) + F; Z = d/2 - F/Qd$$

$$\sum M = 0 = (2Qd \times \frac{1}{2} \times Z \times \frac{1}{3} \times Z) - (\frac{1}{2} \times Qd^2 \times \frac{1}{3} \times d) + F(h + d)$$

Substituting  $Z = d/2 - F/Qd$

$$\begin{aligned}\Sigma M = 0 &= \frac{Qd(d/2 - F/Qd)^2}{3} - \frac{Qd^3}{6} + F(h + d) \\ &= \frac{Qd^3}{12} - \frac{2Fd}{3} - \frac{F^2}{3Qd} - Fh\end{aligned}$$

a) Example: Embedment of Trench Footing

Given:  $F = 186$  lbs (Includes Load Factors)

$h = 5.25'$

$Q^* = 544$  psf/ft of depth (Includes Strength Reduction Factors)

Try  $d = 4.00'$

$$\begin{aligned}\Sigma M = 0 &= \frac{544 \times 4.00^3}{12} - \frac{2 \times 186 \times 4.00}{3} - \frac{186^2}{3 \times 544 \times 4.00} - 186 \times 5.25 \\ &= 2901 - 496 - 5 - 977 \\ &= +1423 \text{ ft-lbs/ft N.G.}\end{aligned}$$

Try  $d = 3.17$

$$\begin{aligned}\Sigma M = 0 &= \frac{544 \times 3.17^3}{12} - \frac{2 \times 186 \times 3.17}{3} - \frac{186^2}{3 \times 544 \times 3.17} - 186 \times 5.25 \\ &= 1444 - 393 - 7 - 977 \\ &= +67 \text{ ft-lbs/ft — Close enough to zero.}\end{aligned}$$

Use  $d = 3'-2"$

The maximum moment in the trench footing can be assumed to occur at  $0.25d$ , thus the Maximum Moment =  $F(h + 0.25d)$ .

$$M_{\max} = 186 \times (5.25 + 0.25 \times 3.17) = 1124 \text{ ft-lbs/ft}$$

3. Pile Embedment by a simplified, approximate method.

The embedment depth of short rigid pile supports that are located in level ground *may be* determined by the following approximate method. This method for determining the depth of

---

\*Note that the 'Isolation' factors for trench footing are 1.0.



pile embedment is a variation of UBC Section 2907 (f). It should not be applied to piles with embedment depths greater than 12 feet. A computer program titled 'UBCS' is available to solve this formula.

$$\text{Formula: } d = \frac{A}{2} \times \left( 1 + \sqrt{1 + \frac{4.36h}{A}} \right)$$

$$\text{Where: } A = \frac{2.34F}{Q_1 b};$$

F = applied ultimate lateral force in pounds;

$Q_1$  = allowable ultimate lateral soil pressure (psf) at a depth of one-third the depth of embedment;

$$Q_1 = \frac{d}{3}$$

b = width or diameter of pile in feet;

h = distance in feet from supporting material to point of application of "F".  
Disregard upper 6" of supporting material;

d = depth of embedment of pile in feet;

Q = allowable net horizontal ultimate lateral soil pressure in psf/ft.

a) Example: Embedment of Trench Footing

Given: F = 1170 lbs (Includes Load Factors)

h = 3.00'

Q = 816 psf/ft of depth (Includes Strength Reduction Factors)

b = 12"

Try d = 3.00'

$$Q_1 = 816 \times \frac{3}{3} = 816 \text{ psf}$$

$$A = \frac{2.34 \times 1170}{816 \times \frac{12}{12}} = 3.36$$

$$d = \frac{3.36}{2} \times \left( 1 + \sqrt{1 + \frac{4.36 \times 3}{3.36}} \right) = 5.40' - 3.00' \text{ assumed}$$

Try  $d = 4.25'$

$$Q_1 = 816 \times \frac{4.25}{3} = 1156 \text{ psf}$$

$$A = \frac{2.34 \times 1170}{1156 \times \frac{12}{12}} = 2.37$$

$$d = \frac{2.37}{2} \times \left( 1 + \sqrt{1 + \frac{4.36 \times 3}{2.37}} \right) = 4.21' \text{ — close enough to } d = 4.25' \text{ assumed}$$

Use  $d = 4'-3"$

The maximum moment in the trench footing can be assumed to occur at  $.25d$ , thus the Maximum Moment =  $F(h + 0.25d)$ .

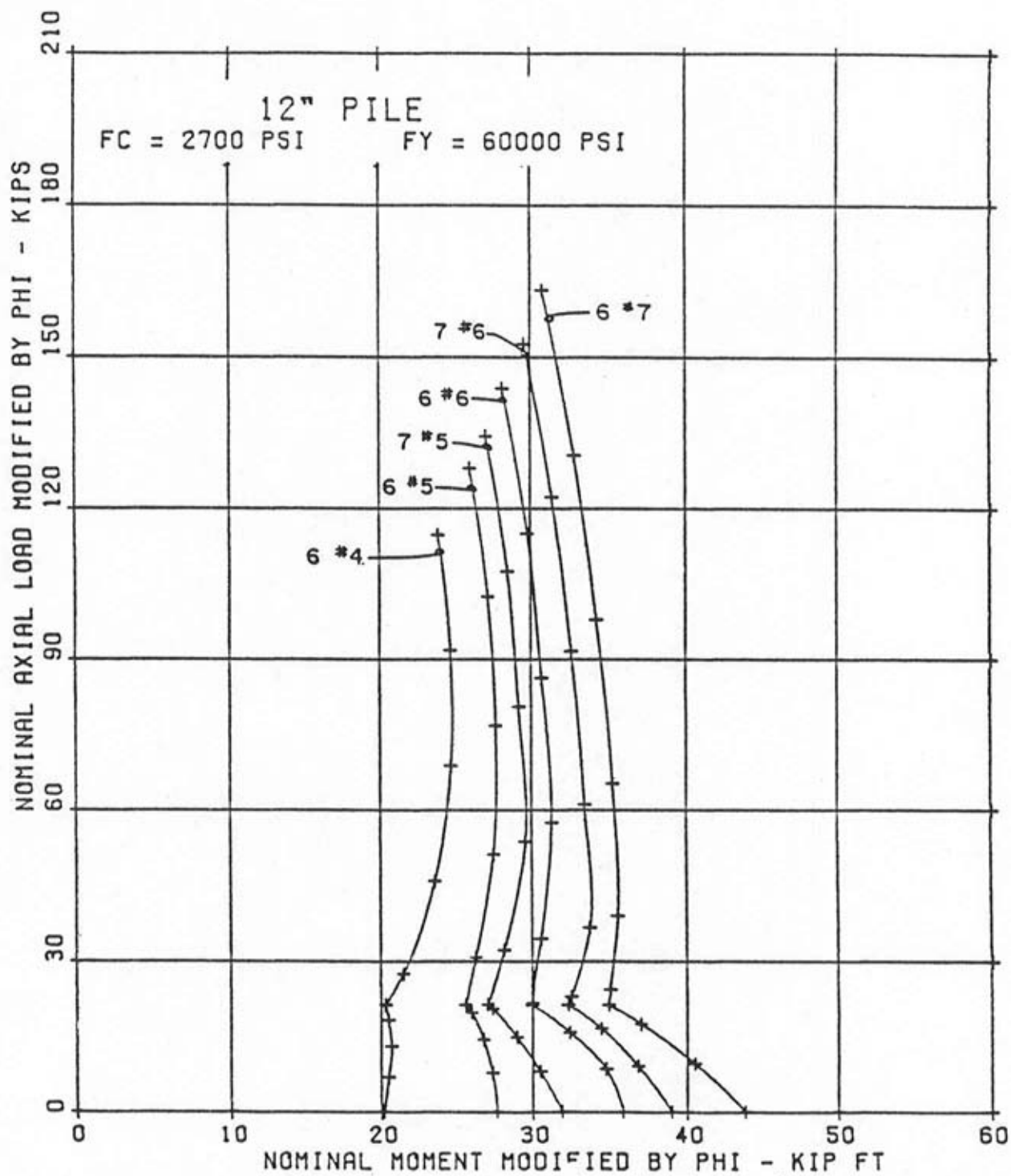
$$M_{\max} = 1170 \times (3.00 + 0.25 \times 4.25) = 4753 \text{ ft-lbs/ft}$$



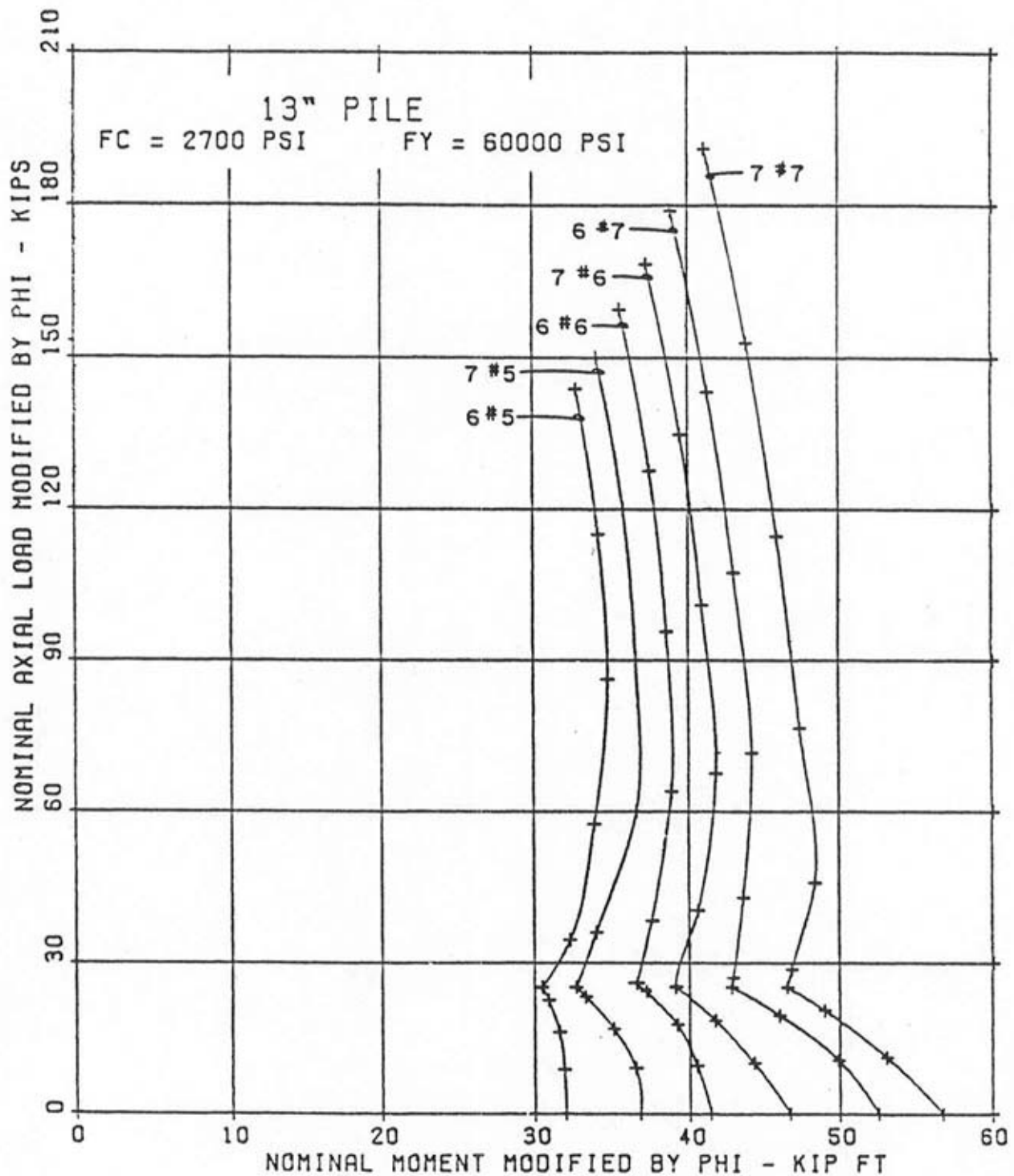
## Interaction Diagrams

The following interaction diagrams may be used for determining the longitudinal pile reinforcement. Note that there are two sets of diagrams. Each set is based on a different ultimate concrete strength. The capacity of most piles should be based on  $f'_c = 2700$  psi, which is the ultimate value for concrete containing five sacks of cement per cubic yard. Piles that support the concrete safety shaped barrier must, however, be based on  $f'_c = 3250$  psi.

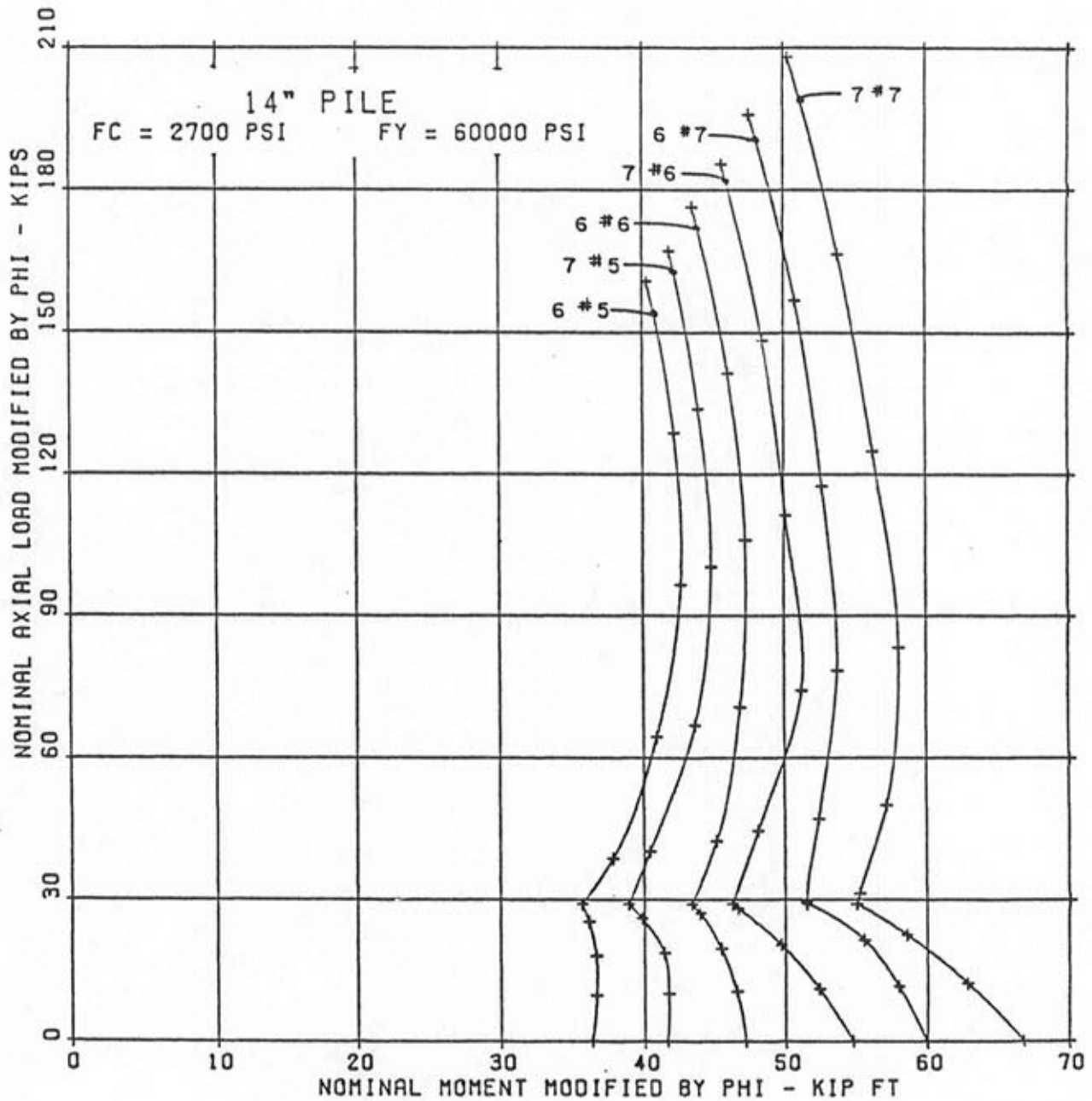
Interaction Diagram • 12" Pile •  $f'_c = 2700$  psi



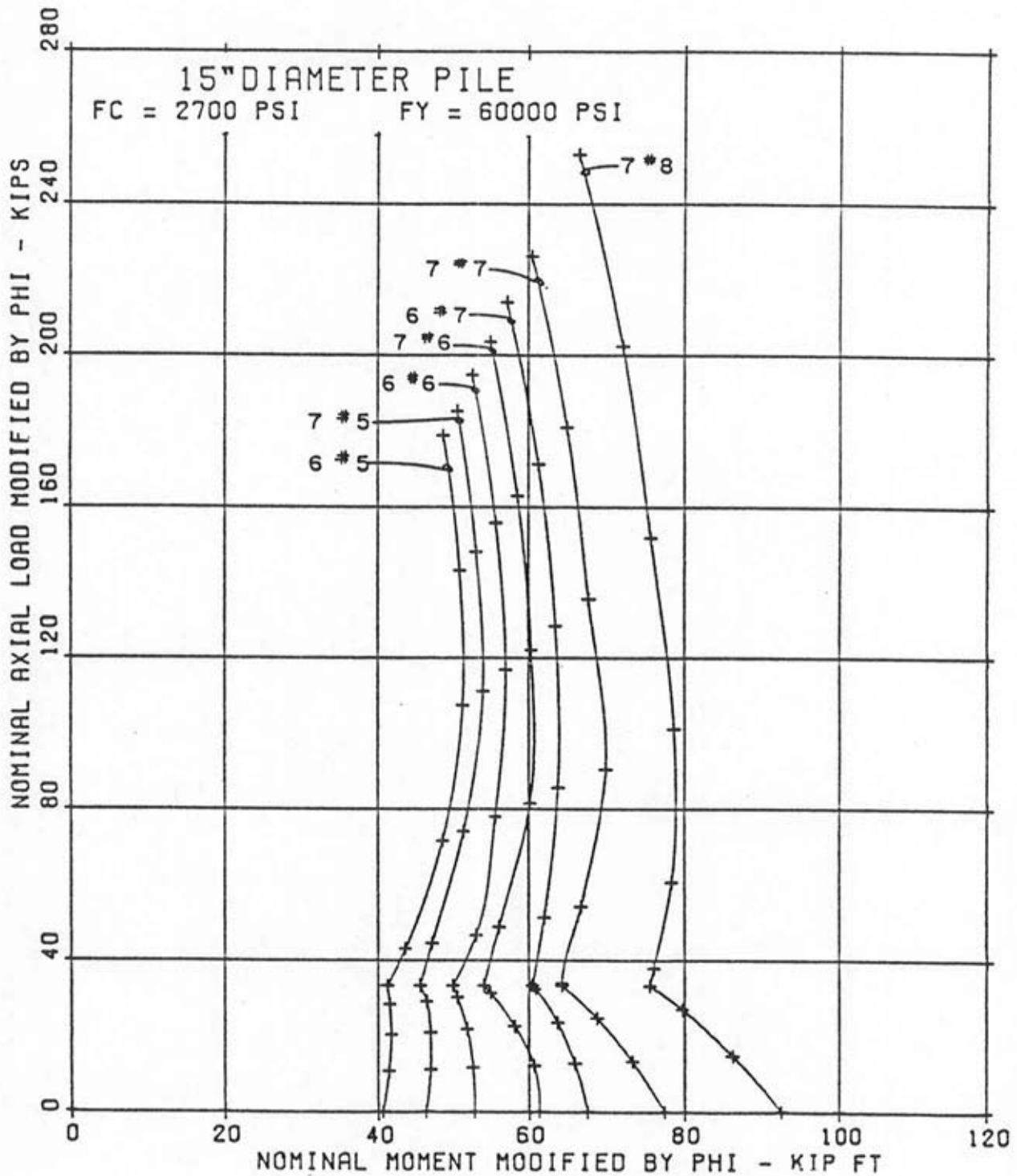
Interaction Diagram • 13" Pile •  $f'_c = 2700$  psi

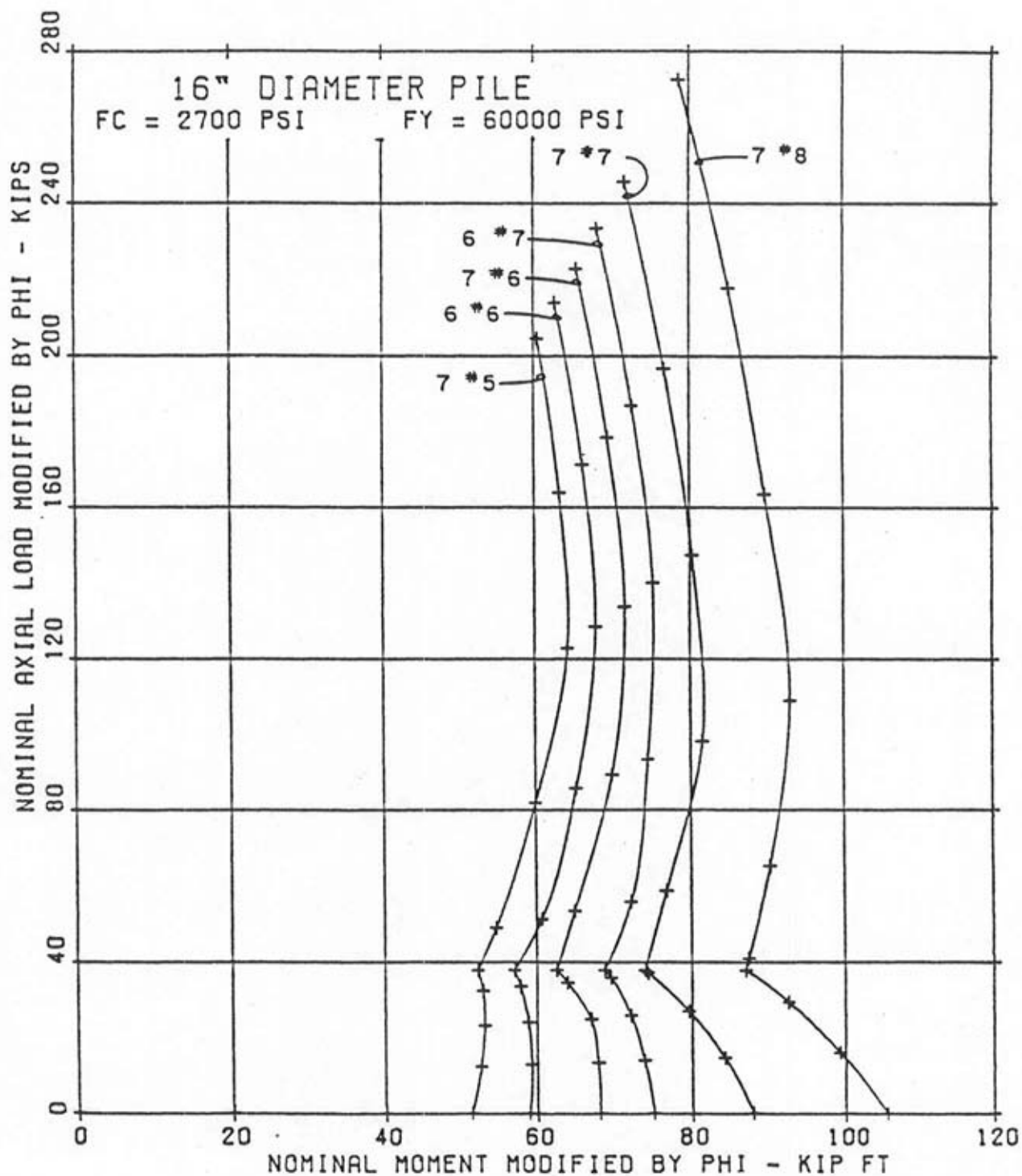


Interaction Diagram • 14" Pile •  $f'_c = 2700$  psi



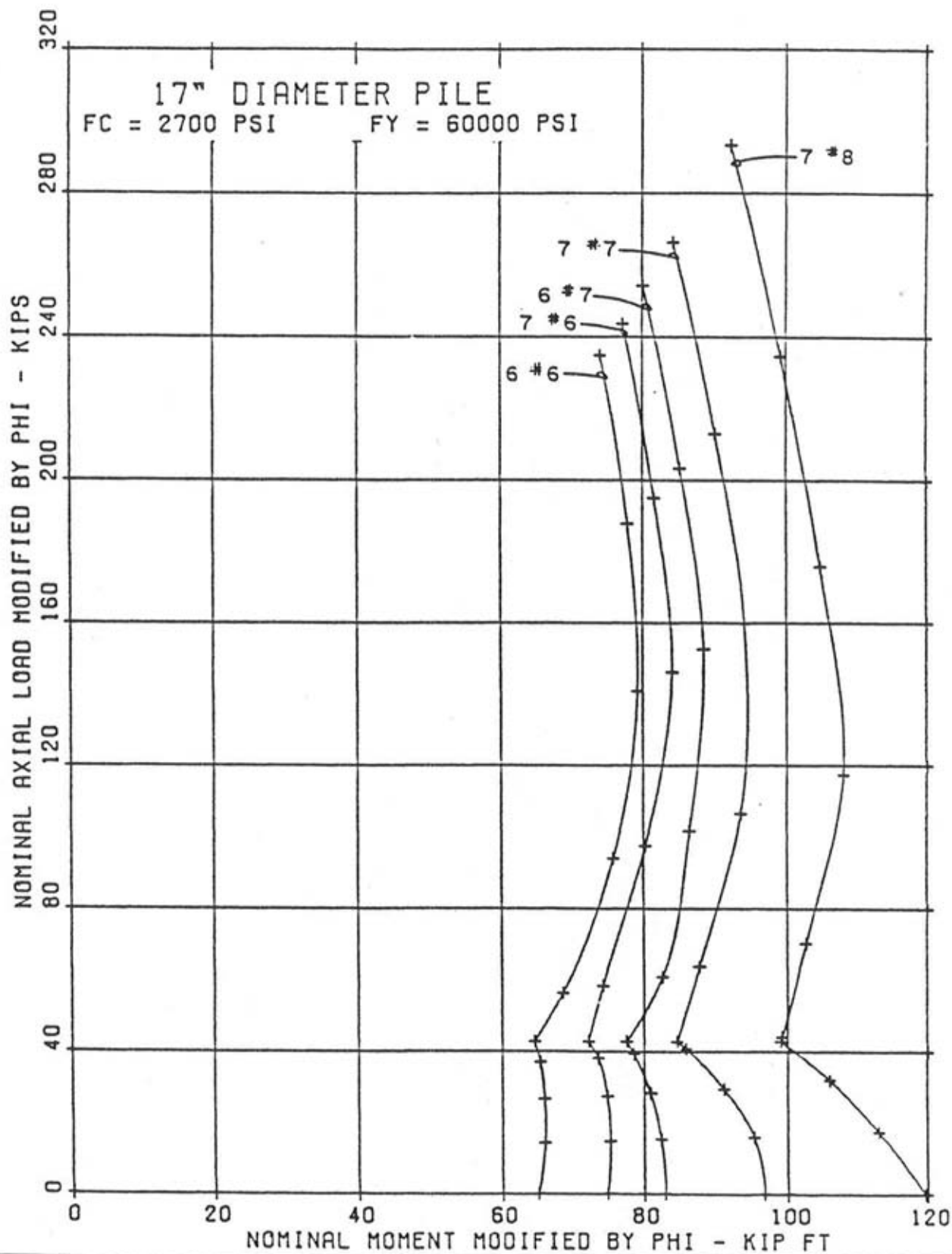
Interaction Diagram • 15" Pile •  $f'_c = 2700$  psi



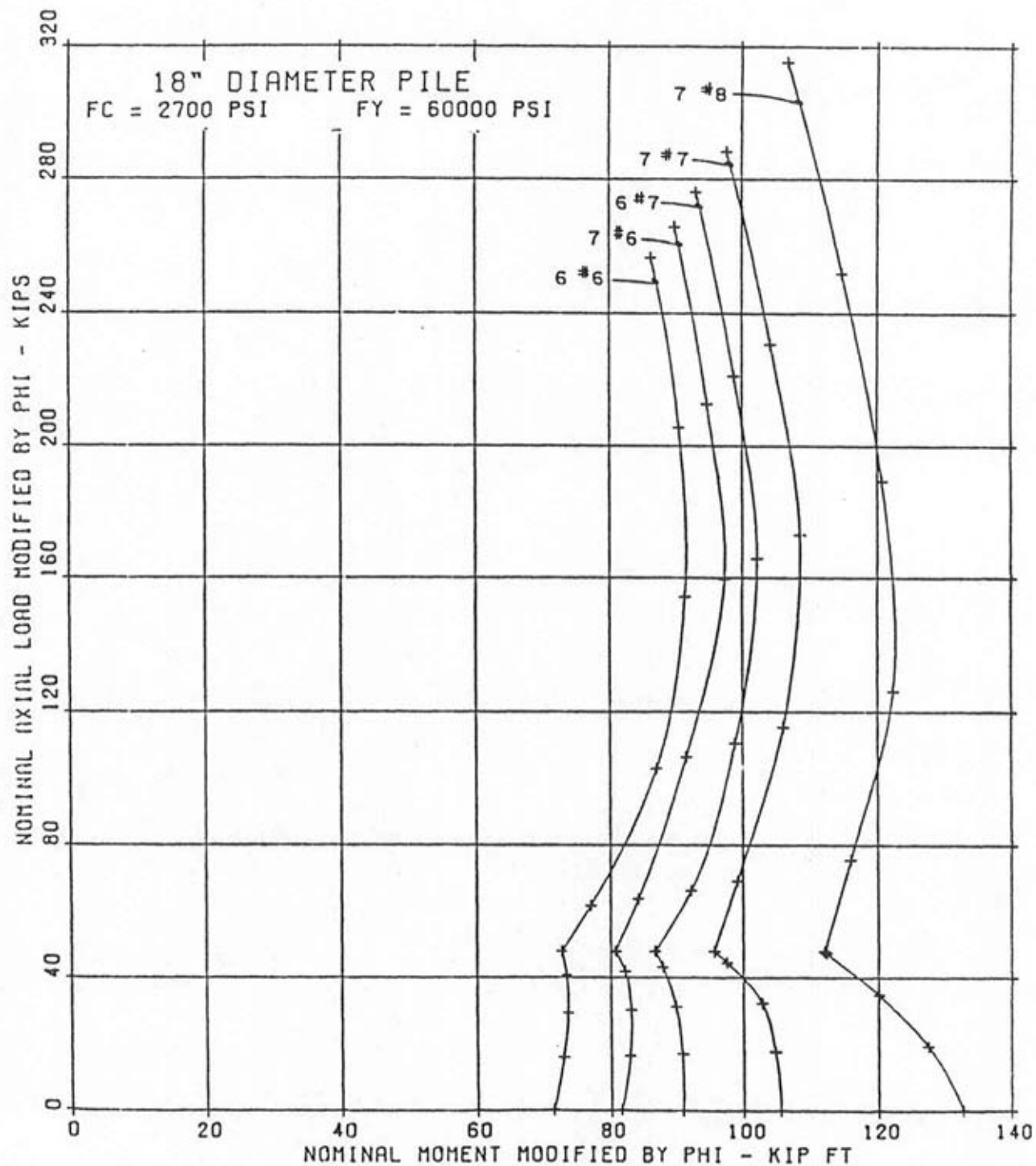
Interaction Diagram • 16" Pile •  $f'_c = 2700$  psi




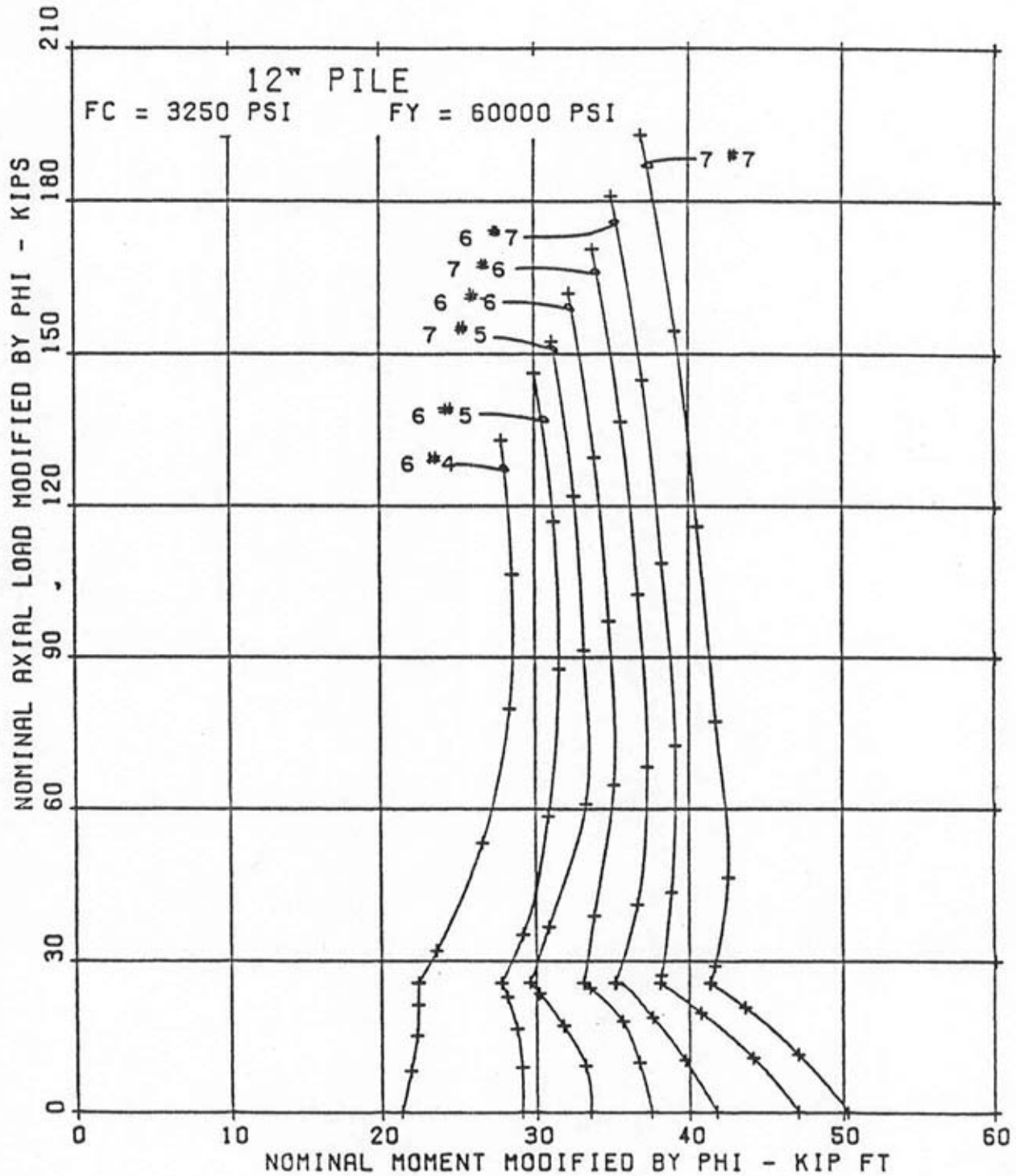
Interaction Diagram • 17" Pile •  $f'_c = 2700$  psi



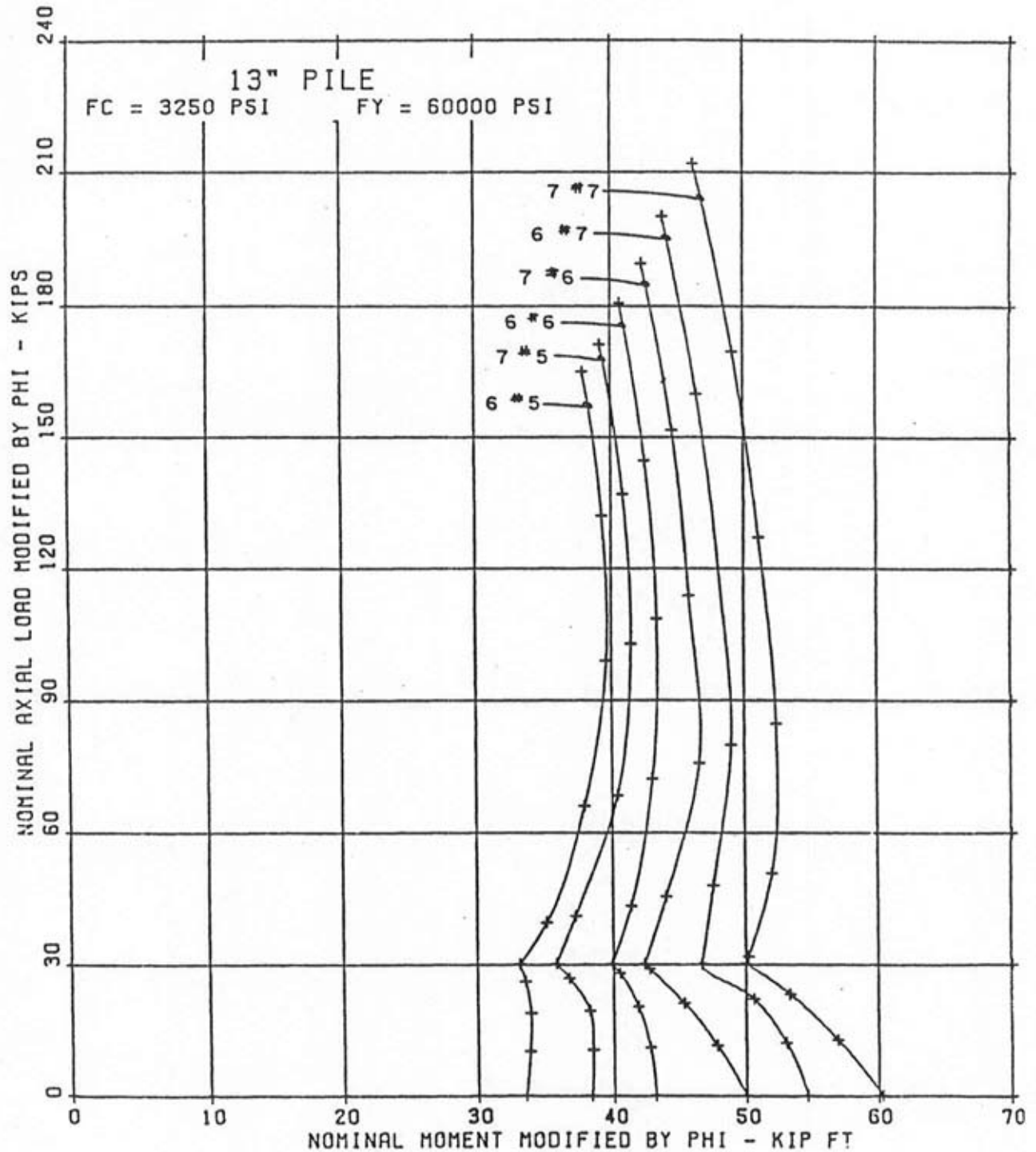
Interaction Diagram • 18" Pile •  $f'_c = 2700$  psi

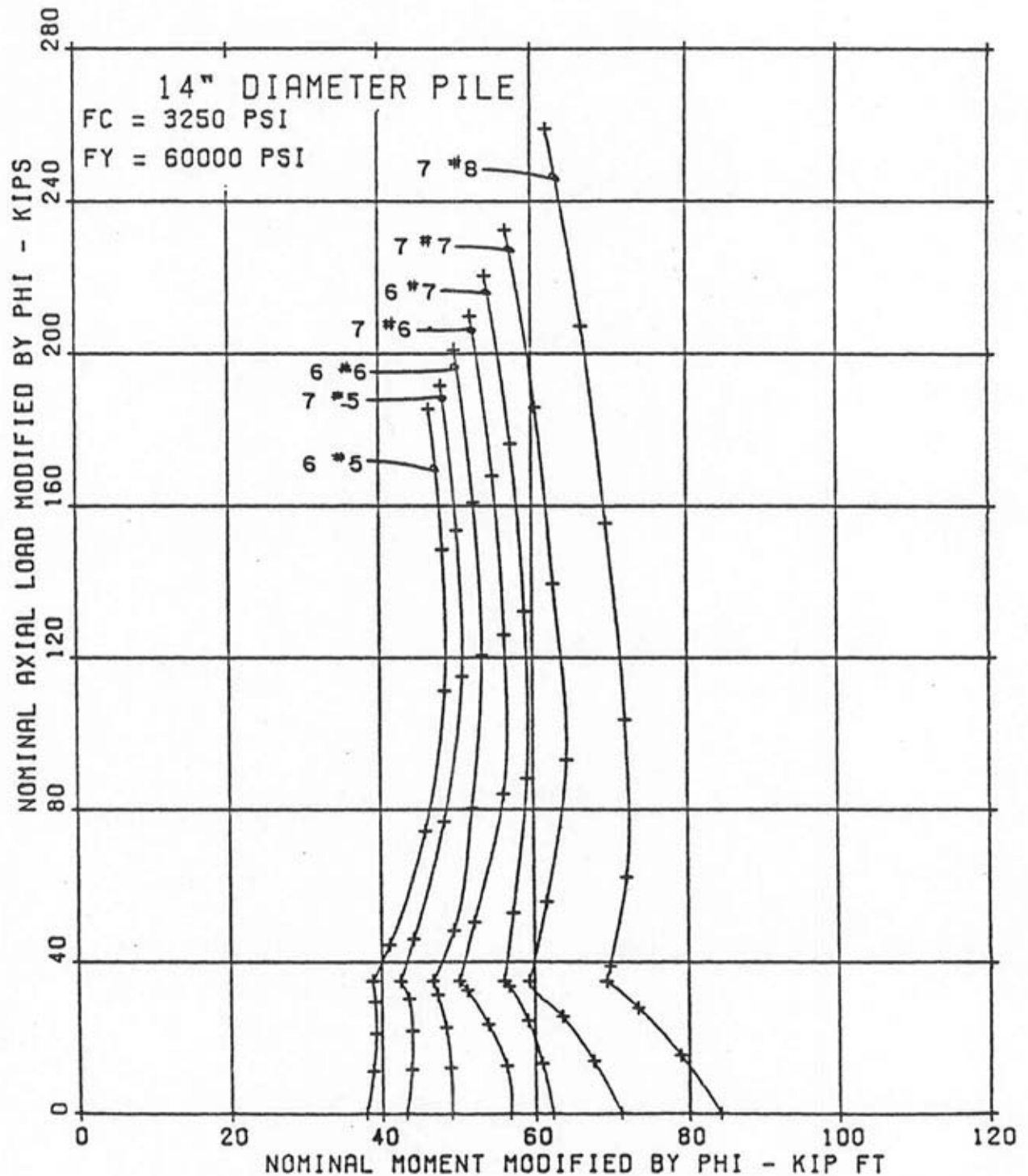


Interaction Diagram • 12" Pile •  $f'_c = 3250$  psi

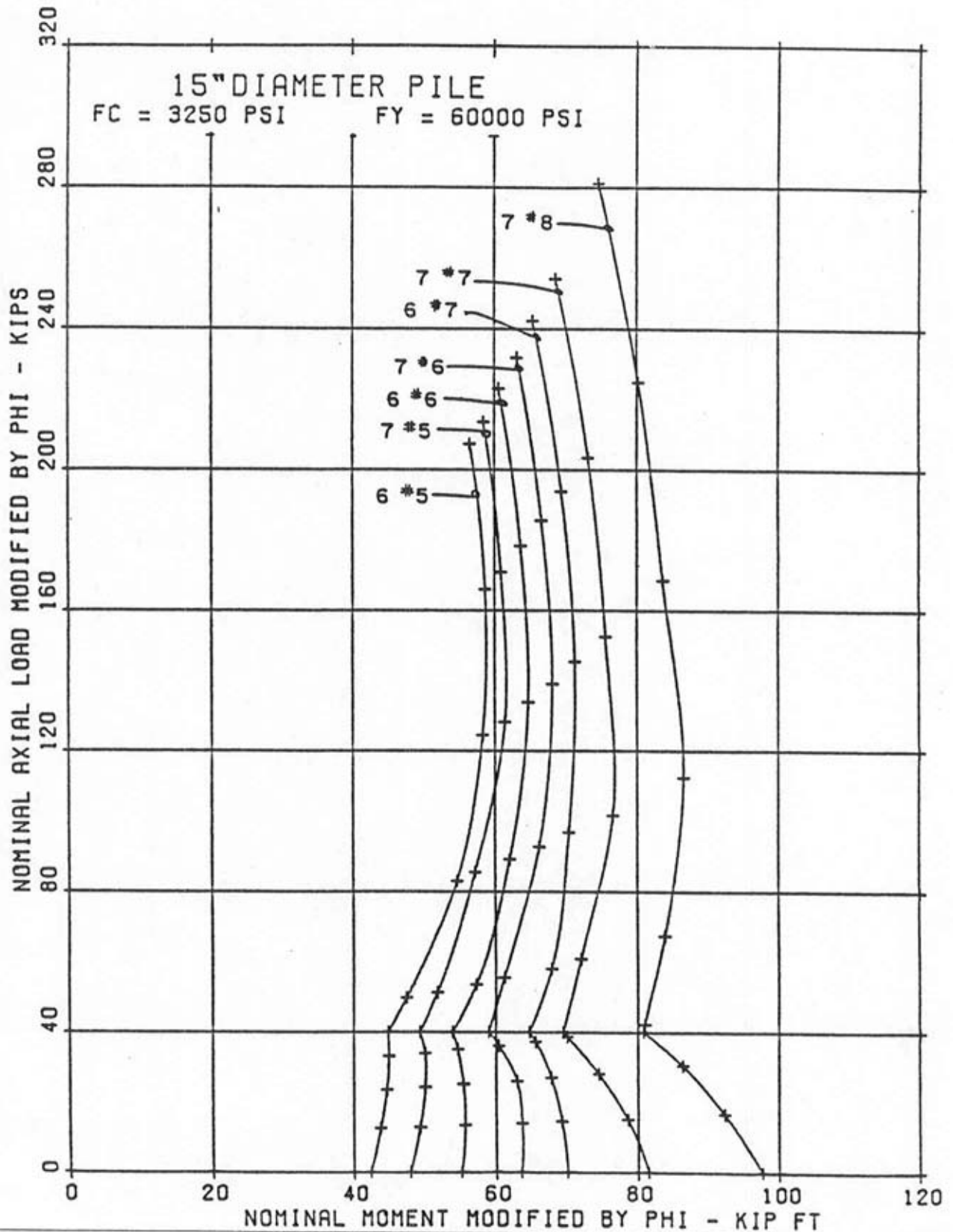


Interaction Diagram • 13" Pile •  $f'_c = 3250$  psi



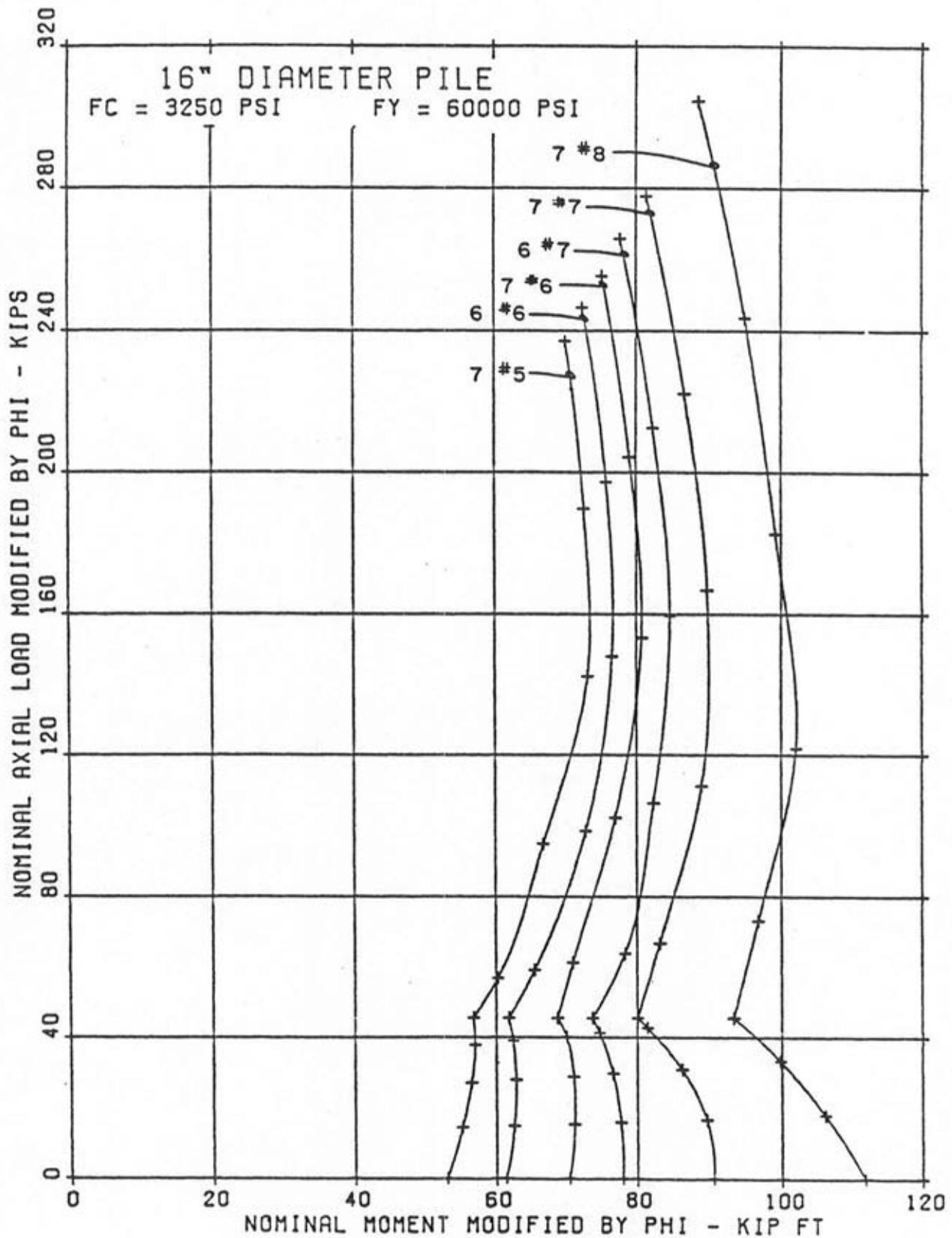
Interaction Diagram • 14" Pile •  $f'_c = 3250$  psi


Interaction Diagram • 15" Pile •  $f'_c = 3250$  psi

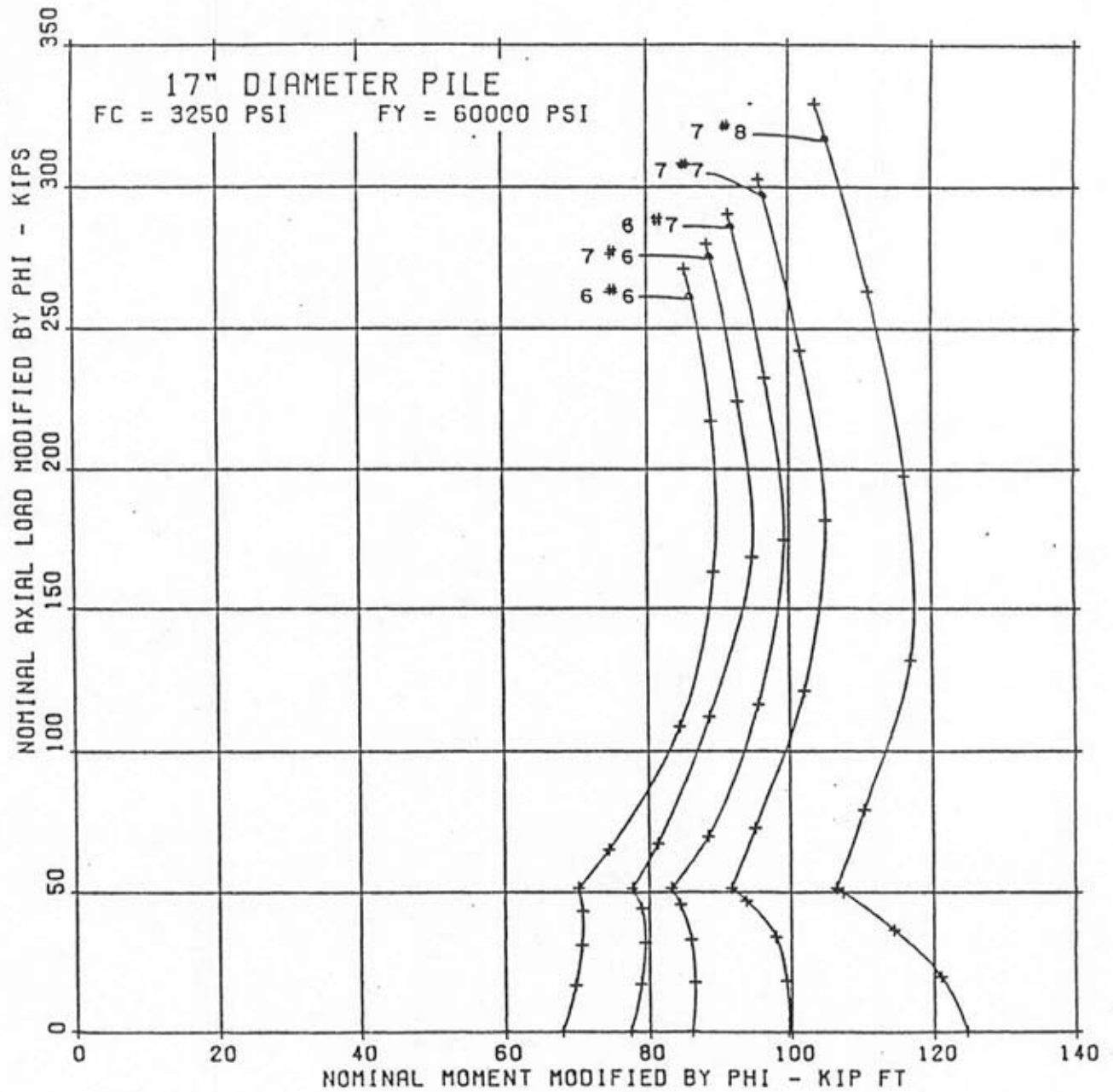




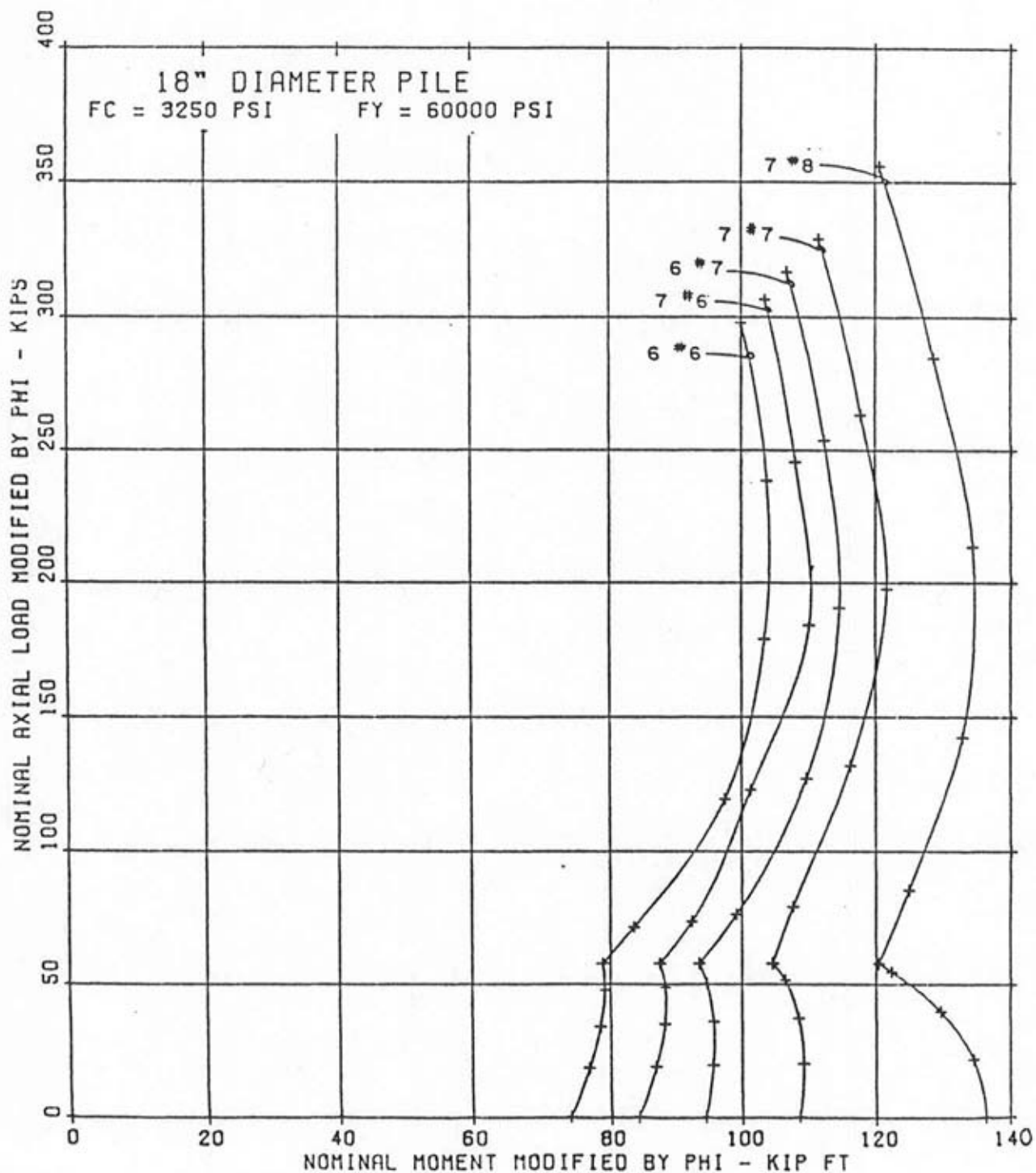
Interaction Diagram • 16" Pile •  $f'_c = 3250$  psi



Interaction Diagram • 17" Pile •  $f'_c = 3250$  psi



Interaction Diagram • 18" Pile •  $f'_c = 3250$  psi



## Sound Wall – Standard Aesthetic Features

### Masonry Block Instructions and Information

#### Purpose

To establish Standard Aesthetic Features within an economical structural framework.

#### Requirements

Bridge Standard Detail sheets are available from the Office of Structure Design under the general title "Sound Wall – Standard Aesthetic Features" with the following subtitle:

"Masonry Block – Aesthetic Details No. 1" .....XS 3-85.0

- A. The aesthetic features designer should produce an equal scale elevation drawing describing aesthetic features such as end of wall, steps, pattern, color and texture. These features should be transferred to the "Standard Aesthetic Features" sheets. The Resident Engineer will forward the contractor's equal scale elevation drawing to the aesthetic features designer for approval.
- B. The standard sound wall details have been designed to include the effects of the standard aesthetic features.
  - 1. Revised or modified standard aesthetic features must be checked for structural integrity.
  - 2. Sound walls designed in the District without aesthetic review, either in-house or from other sources, are to be submitted to the Office of Structure Design for review prior to finalizing plans.
- C. There are no major problems laying block on the grades and vertical curves that are used along freeway sections and along the typical on and off ramps. Experience indicates the appearance of vertical joints between blocks, expansion joints and ends of walls will be satisfactory for grades up to 6 percent.
- D. The basic masonry block is  $7\frac{5}{8}$ " wide (thick)  $\times$   $7\frac{5}{8}$ " high  $\times$   $15\frac{5}{8}$ " long. Slumpstone masonry block is  $5\frac{5}{8}$ " high. Blocks  $11\frac{5}{8}$ " wide (thick) can be used to form a cap on top of the wall or to form a relief in the areas shown on the structural drawings.
- E. The special provisions will specify that the colors be selected from the manufacturer's standard and may require the contractor to furnish samples of the block he proposes to use. The Engineers will approve the color before the contractor orders block for the project. The standard color will be gray.

- F. Block textures should be selected from those that are commercially available. The smooth or plain face block will be the standard. Fluted or scored block must be detailed on the plans. The number and the dimensions of the scores or flutes should be shown on a drawing. Tolerances in the dimensions and an optional number of flutes or scores should be allowed. The 12" wide projecting block with the cell dimensions of the 8" wide block will not be cost effective when compared with other type of blocks.
- G. The details and dimensions of sculptural patterns must be shown. See Masonry Block on Barrier, Details No. 2, Alternative #6, Detail "U" for limits and dimensions. The typical section is shown on Sound Wall – Masonry Block Miscellaneous Details sheet.
- H. Vertical delineation lines should be located at the expansion joints which are spaced at 80'-0" maximum.
- I. Since changes can be made on the standard details from time to time, it is important to always order new copies from the original tracings. Making copies from a film already on hand has resulted in project plans going to contract with outdated details. Duplicate vellums of the original standard details for use by Office of Structure Design and District Project Development may be ordered from the Floor Clerks, telephone 916-324-0553 (ATSS 8-454-0553) or telephone 916-327-2004 (ATSS 8-467-2004). Duplicate reproductions for use by private consultants can be obtained from the Technical Publication Section, telephone 324-7439 (ATSS 454-7439). There is a charge to the consultants unless the request is made for them through the Externally Financed Branch for jobs being constructed on the State Highway System.
- J. Additional information may be obtained from the Aesthetic and Models Section 916-445-2138 (ATSS 8-485-2138).

**MASONRY BLOCK FACES**

A PLAIN

B SLUMPSTONE

C SPLIT-FACE FLUTED

D COMBED

E 3-Score PLAIN

F 5-Score PLAIN

**BOND TYPES**

1 STACKED BOND

2 COMMON BOND

**TYPICAL WALL SEGMENT**  
8" x 8" x 16" BLOCK

TRAFFIC SIDE

TRAFFIC SIDE AND OTHER SIDE SIMILAR

**END TYPE**

MORTAR CAP

TO TRAFFIC SIDE

TO TRAFFIC SIDE

**SECTION**

MORTAR CAP

VARIES

PRELIMINARY

**STANDARD DRAWING**

PROJECT NUMBER: \_\_\_\_\_

DATE: \_\_\_\_\_

BY: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

IN THE FIELD USE ONLY

THIS SHEET IS FOR INFORMATION ONLY  
DO NOT USE WITH CONTRACT PLANS

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES  
STRUCTURE DESIGN

**SOUND WALL-STANDARD AESTHETIC FEATURES**

MASONRY BLOCK

DETAILS NO. 1



## Sound Wall - Standard Aesthetic Features

### Precast Concrete Panels with Posts Instructions and Information

#### Purpose

To establish Standard Aesthetic Features within an economical structural framework.

The wide variety of design possibilities inherent in precast concrete must be limited to allow reuse of casting facilities with minimal change to the facility.

#### Requirements

Standard aesthetic features applications are limited, for the present, to precast ground supported panels with posts. Bridge Standard Detail Sheets are available from the Office of Structure Design under the general title "Sound Wall - Standard Aesthetic Features" with the following subtitles:

"Precast Concrete Panels Post Both Sides - Aesthetic Details No. 1" .....XS 3-77.13

"Precast Concrete Panels Post One Side - Aesthetic Details No. 2" .....XS 3-77.14

- A. The basic structural panel is four inches thick. The panel has been structurally designed to support a thickness of five inches. The basic four inch thick panel is a core to which textured material may be added. One inch of material may be added to one side only, or divided to provide treatment to both sides. *The total panel thickness must not exceed five inches.*
- B. Panels may be designed with posts visible on one side only, or on both sides. Posts visible on both sides will project approximately four inches on each side of the panel. Posts visible on one side will project approximately eight inches..
- C. The "Precast Panels with Posts" system can negotiate a 2 percent grade without resorting to steps; however, the post will not be plumb.

Panels can be formed in trapezoidal shapes to negotiate up to 6 percent grades. The panels are formed horizontally on a steel table with a dropped edge to form the post.

This means it is easy to form tapers to follow the ground; however, the available panel height will decrease if the bottom at ground line and top of wall are to be parallel *and* the standard facility is used for casting.

- D. Painting is the only practical method of obtaining color. Color change lines should be delineated with a groove.

- E. Casting the panels on a steel form allows a very smooth precise down side or cast side on the panel. Grooves are formed on this down side by the use of strips of wood or plastic stuck to the steel form with silicone. This is an inexpensive process.

Form liners can be fastened to the entire steel form or to portions of it. Grooves should be used to separate textures. Strips of form liners up to four feet wide are relatively inexpensive, however, a standard form liner pattern should be used.

Aggregate can be placed on the steel form and the panel poured integrally. A very good exposed aggregate texture will be produced as proposed to a not so good exposed aggregate texture produced by a form liner.

Form liner placed over the entire steel form is an expensive texture and should be limited to standard textures to produce the maximum number of re-uses making the cost per single casting less significant.

- F. The top or up side of the horizontally cast panel must be considered a hand finished surface. Therefore, any normal concrete finishes such as steel trowel, wood float or broomed finish are the least expensive.




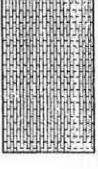





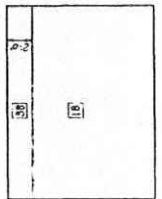
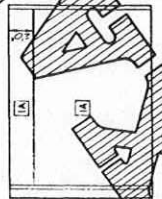

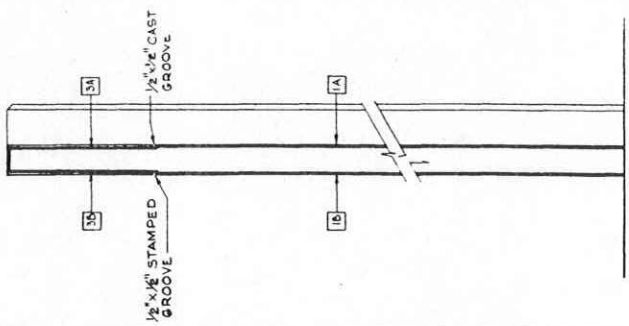
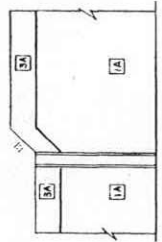
For a little additional expense, grooves can be tooled into the finished surface or patterns stamped into the surface. This stamping is limited to about  $\frac{3}{8}$ " depth.

Textures can be obtained in this top side which are virtually indistinguishable from those produced on the bottom or cast side utilizing the standard textures.

The top surface can be washed to create exposed aggregate inexpensively or seeded with the same aggregate used to pour the panel integrally against the cast side.

- G. Cast textures produced on the down side of the panel shall be limited to the following until demand for additional textures justifies producing additional standards.
1. Form liner textures.
    - a. Slumpstone.
    - b. Vertical groove.
  2. Insets produced by strips or blockouts.
  3. Exposed aggregate produced by placing concrete against selected aggregate resulting in an integral aggregate panel.

- H. Textures on the top side or hand finished side of the panel shall be limited to standard concrete finishes such as:
1. Steel trowel.
  2. Wood float.
  3. Broom.
  4. Washed exposed aggregate.
  5. Exposed aggregate (seeded).
- I. Architectural features on the top or hand finished side can resemble cast features on the down side by using:
1. Stamps.
  2. Tools to form lines or grooves.
- J. Since changes can be made on the standard details from time to time, it is important to always order new copies from the original tracings. Making copies from a film already on hand has resulted in project plans going to contract with outdated details. Duplicate vellums of the original standard details for use by Office of Structure Design and District Project Development may be ordered from the Floor Clerks, telephone 916-324-0553 (ATSS 8-454-0553) or telephone 916-327-2004 (ATSS 8-467-2004). Duplicate reproducibles for use by private consultants can be obtained from the Technical Publication Section, telephone 324-7439 (ATSS 454-7439). There is a charge to the consultants unless the request is made for them through the Externally Financed Branch for jobs being constructed on the State Highway System.
- K. Additional information may be obtained from the Aesthetic and Models Section 916-445-2138 (ATSS 8-485-2138).

<p><b>TEXTURE</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CAST SIDE</p>  <p>1A</p> </div> <div style="text-align: center;"> <p>WORKED SIDE</p>  <p>1B</p> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>PLAN</p>  <p>2A</p> </div> <div style="text-align: center;"> <p>TROWELED</p>  <p>2B</p> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>SLUMP</p>  <p>3A</p> </div> <div style="text-align: center;"> <p>ADOBE STAMP</p>  <p>3B</p> </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>VERTICAL GROOVE</p>  <p>4A</p> </div> <div style="text-align: center;"> <p>VERTICAL GROOVE</p>  <p>4B</p> </div> </div> <div style="text-align: center;"> <p>HORIZONTAL GROOVES</p>  <p>4C</p> </div>	<p><b>TYPICAL PANEL</b></p>  <p>TRAFFIC SIDE</p>  <p>TRUCK SIDE</p>	<p><b>END TYPE</b></p> 	<p><b>SECTION</b></p> 	<p><b>ELEVATION TRANSITION TYPE</b></p> 																								
<p><b>7</b></p> <p>SOUND WALL - STANDARD AESTHETIC FEATURES</p> <p>PRECAST CONCRETE PANELS - POST ONE SIDE</p> <p>DETAILS NO. 2</p>																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2"> <p>THIS SHEET IS FOR INFORMATION ONLY DO NOT USE WITH CONTRACT PLANS</p> </td> <td colspan="2"> <p>STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION</p> </td> <td colspan="2"> <p>DIVISION OF STRUCTURES STRUCTURE DESIGN</p> </td> <td colspan="2"> <p>PROJECT NO. _____</p> </td> </tr> <tr> <td colspan="2"> <p>STANDARD DRAWING</p> </td> <td colspan="2"> <p>DESIGNED BY _____</p> </td> <td colspan="2"> <p>CHECKED BY _____</p> </td> <td colspan="2"> <p>DATE _____</p> </td> </tr> <tr> <td colspan="2"> <p>FILE NO. _____</p> </td> <td colspan="2"> <p>DATE _____</p> </td> <td colspan="2"> <p>DATE _____</p> </td> <td colspan="2"> <p>DATE _____</p> </td> </tr> </table>					<p>THIS SHEET IS FOR INFORMATION ONLY DO NOT USE WITH CONTRACT PLANS</p>		<p>STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION</p>		<p>DIVISION OF STRUCTURES STRUCTURE DESIGN</p>		<p>PROJECT NO. _____</p>		<p>STANDARD DRAWING</p>		<p>DESIGNED BY _____</p>		<p>CHECKED BY _____</p>		<p>DATE _____</p>		<p>FILE NO. _____</p>		<p>DATE _____</p>		<p>DATE _____</p>		<p>DATE _____</p>	
<p>THIS SHEET IS FOR INFORMATION ONLY DO NOT USE WITH CONTRACT PLANS</p>		<p>STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION</p>		<p>DIVISION OF STRUCTURES STRUCTURE DESIGN</p>		<p>PROJECT NO. _____</p>																						
<p>STANDARD DRAWING</p>		<p>DESIGNED BY _____</p>		<p>CHECKED BY _____</p>		<p>DATE _____</p>																						
<p>FILE NO. _____</p>		<p>DATE _____</p>		<p>DATE _____</p>		<p>DATE _____</p>																						

## Sound Wall – Standard Aesthetic Features

### Cast-In-Place Concrete Instructions and Information

#### Purpose

To establish Standard Aesthetic Features within an economical structural framework.

#### Requirements

Bridge Standard Detail Sheets are available from the Office of Structure Design under the general title "Sound Wall – Standard Aesthetic Features" with the following subtitles:

"Cast-In-Place Concrete – Aesthetic Details No. 1" .....XS 3-77.15





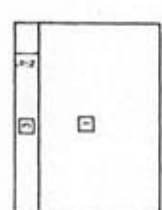
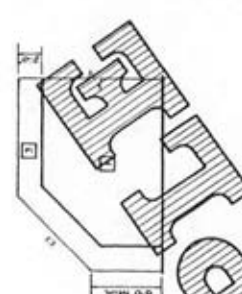
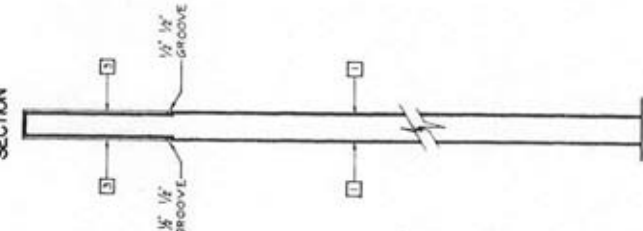
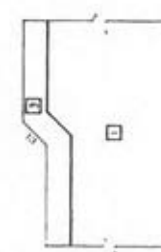
- A. The aesthetic features designer should produce an equal scale elevation drawing describing aesthetic features such as end of wall, steps, pattern, color and texture. These features should be transferred to the "Standard Aesthetic Features" sheets. The Resident Engineer will forward the contractor's equal scale elevation drawing to the aesthetic features designer for approval.
- B. The standard sound wall details have been designed to include the effects of the standard aesthetic features.
  - 1. Revised or modified standard aesthetic features must be checked for structural integrity.
  - 2. Sound walls designed in the District without aesthetic review, either in-house or from other sources, are to be submitted to the Office of Structure Design for review prior to finalizing plans.
- B. Standard finish will be natural color class "A" concrete. Textured area may be stained to provide greater contrast.
- D. Textures should be selected from commercially available sources.
- E. Vertical delineation lines should be located at the expansion joints which are spaced at 80'-0" maximum (as shown on the engineering drawings).
- F. Since changes can be made on the standard details from time to time, it is important to always order new copies from the original tracings. Making copies from a film already on hand has resulted in project plans going to contract with outdated details. Duplicate vellums of the original standard details for use by Office of Structure Design and District Project Development may be ordered from the Floor Clerks, telephone 916-324-0553 (ATSS 8-454-0553) or telephone 916-327-2004 (ATSS 8-467-2004). Duplicate reproducibles for use by private consultants can be obtained from



the Technical Publication Section, telephone 324-7439 (ATSS 454-7439). There is a charge to the consultants unless the request is made for them through the Externally Financed Branch for jobs being constructed on the State Highway System.

- G. Additional information may be obtained from the Aesthetic and Models Section 916-445-2138 (ATSS 8-485-2138).



<p><b>TEXTURE</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  1. PLAIN         </div> <div style="text-align: center;">  2. SLUMP         </div> <div style="text-align: center;">  3. VERTICAL GROOVE         </div> <div style="text-align: center;">  4. HORIZONTAL GROOVES         </div> </div>	<p><b>TYPICAL WALL SEGMENT</b></p> <div style="text-align: center;">  </div>	<p><b>END TYPE</b></p> <div style="text-align: center;">  </div>	<p><b>SECTION</b></p> <div style="text-align: center;">  </div>	<p><b>ELEVATION TRANSITION TYPE</b></p> <div style="text-align: center;">  </div>
<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">CALTRANS</p>				
<p><b>10</b></p> <p><b>SOUND WALL-STANDARD AESTHETIC FEATURES</b> CAST-IN-PLACE CONCRETE DETAILS NO. 1</p>				

FILE NO. SHEET NO. DATE	PROJECT NO. CONTRACT NO. DRAWING NO.	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	SHEET NO. TOTAL SHEETS	PROJECT NO. CONTRACT NO. DRAWING NO.
-------------------------------	--	---	--	---------------------------	--

THIS SHEET IS FOR INFORMATION ONLY  
DO NOT USE WITH CONTRACT PLANS

## Sound Wall – Standard Aesthetic Features

### Composite Plaster Panel Sound Wall Instructions and Information

#### Purpose

To establish Standard Aesthetic Features within an economical structural framework.

#### Requirements

Bridge Standard Detail Sheets are available from the Office of Structure Design under the general title “Sound Wall – Standard Aesthetic Features” with the following subtitle:









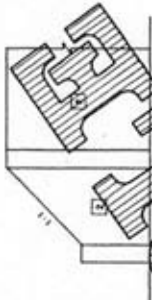

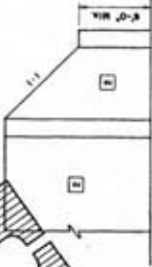
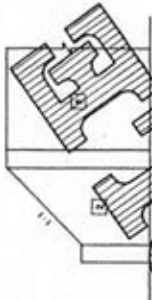
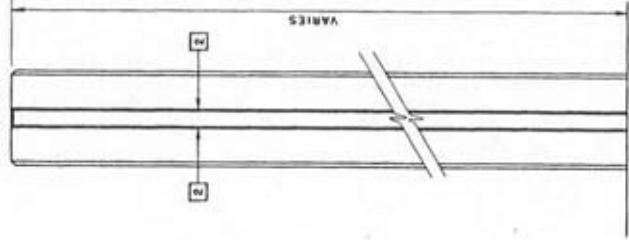
“Composite Plaster Panel – Aesthetic Details No. 1” .....XS 3-86.5

- A. The aesthetic features designer should produce an equal scale elevation drawing describing aesthetic features such as end of wall, steps, pattern, color and texture. These features should be transferred to the “Standard Aesthetic Features” sheets. The Resident Engineer will forward the contractor’s equal scale elevation drawing to the aesthetic features designer for approval.
- B. The standard sound wall details have been designed to include the effects of the standard aesthetic features.
  - 1. Revised or modified standard aesthetic features must be checked for structural integrity.
  - 2. Sound walls designed in the District without aesthetic review, either in-house or from other sources, are to be submitted to the Office of Structure Design for review prior to finalizing plans.
- C. The special provisions will specify that the colors be selected from the manufacturer’s Integral Plaster Finish Coat Standards and may require the contractor to furnish samples of color he purposes to use. The Engineer will approve the color. The standard color will be tan.
- D. Textures should be selected from those shown on Composite Plaster Panel – Aesthetic Details No. 1. The dimensions of the scores or pattern should be shown on a drawing.
- E. Vertical delineation lines should be located at the expansion joints which are spaced at 80'-0" maximum (as shown on the engineering drawings).
- F. Since changes can be made on the standard details from time to time, it is important to always order new copies from the original tracings. Making copies from a film already on hand has resulted in project plans going to contract with outdated details. Duplicate vellums of the original standard details for use by Office of Structure Design and District Project Development may be ordered from



the Floor Clerks, telephone 916-324-0553 (ATSS 8-454-0553) or telephone 916-327-2004 (ATSS 8-467-2004). Duplicate reproducibles for use by private consultants can be obtained from the Technical Publication Section, telephone 324-7439 (ATSS 454-7439). There is a charge to the consultants unless the request is made for them through the Externally Financed Branch for jobs being constructed on the State Highway System.

- G. Additional information may be obtained from the Aesthetic and Models Section 916-445-2138 (ATSS 8-485-2138).

TEXTURE	TYPICAL PANEL	END TYPE	SECTION
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  1 FLOAT </div> <div style="text-align: center;">  2 HEAVY DASH </div> <div style="text-align: center;">  3 MEDIUM DASH </div> <div style="text-align: center;">  4 HORIZONTAL COMBED </div> <div style="text-align: center;">  5 HORIZONTAL GROOVES </div> <div style="text-align: center;">  6 HORIZONTAL BAND </div> </div> <div style="text-align: center; margin-top: 10px;">  7 SKIP TROWELED (UNEVEN) </div>	<div style="text-align: center;">  TYPICAL PANEL </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  TRAFFIC SIDE </div> <div style="text-align: center;">  OTHER SIDE </div> </div> <div style="text-align: center; margin-top: 20px;">  ELEVATION TRANSITION TYPE </div>	<div style="text-align: center;">  END TYPE </div>	<div style="text-align: center;">  SECTION </div>

DATE: \_\_\_\_\_


DESIGNED BY: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

SHEET NO. \_\_\_\_\_

TOTAL SHEETS \_\_\_\_\_



PROJECT NO. \_\_\_\_\_

SECTION NO. \_\_\_\_\_

DATE: \_\_\_\_\_

13

SOUND WALL - STANDARD AESTHETIC FEATURES

COMPOSITE PLASTER PANEL

DETAILS NO. 1

FOR INFORMATION ONLY  
DO NOT USE WITH CONTRACT PLANS